

A revision on *Chitoria sordida* and *C. naga* (Lepidoptera, Nymphalidae)

Akio MASUI

#404, 2-13-9, Himon'ya, Meguro, Tokyo, 152-0003 Japan

Abstract There has been controversial issue on the classification of *Chitoria sordida* (Moore, 1866) and *C. naga* (Tytler, 1914). These species are similar to each other at a glance, but easily distinguishable. The diagnosis of each species is described. *Chitoria sordida*, ranging from Sikkim–Bhutan–Manipur to N. Myanmar (ssp. *sordida*) and from N. Vietnam to E. Laos (ssp. *vietnamica*) prefers lower altitude, ca 500 m, whereas *Chitoria naga*, ranging from Nagaland–N. Myanmar–S. Yunnan–N. Thailand to N. Laos prefers higher altitude, ca 1,000–2,000 m. The recently described *C. sordida hani* Yoshino, 1999 is sunk to a junior synonym of *C. naga* (Tytler, 1914). In addition, *Chitoria modesta* (Oberthür, 1906), often regarded as a subspecies of *C. sordida*, is separated from these two species.

Key words Nymphalidae, Apaturinae, *Chitoria*, *Chitoria modesta*, *Chitoria naga*, *Chitoria sordida*, *Chitoria sordida vietnamica*, *Chitoria sordida hani*.

Introduction

In recent years, *Chitoria sordida* has been recorded from some localities in the Lao P. D. R. The species is apparently separated into two groups in Laos; one is the north group from Phong Sali, Xam Neua and Xiang Khouang (Masui & Harada, 1993; Masui & Uehara, 1994; Sashida *et al.*, 1996; Koiwaya & Harada, 1996; Koiwaya & Wakahara, 1998; Sashida & Miyamoto, 1998; Osada *et al.*, 1999; Igarashi & Fukuda, 2000) and the other is the east group from Lak Sao (Sashida & Miyamoto, 1996, 1998; Koiwaya & Wakahara, 1998; Osada *et al.*, 1999).

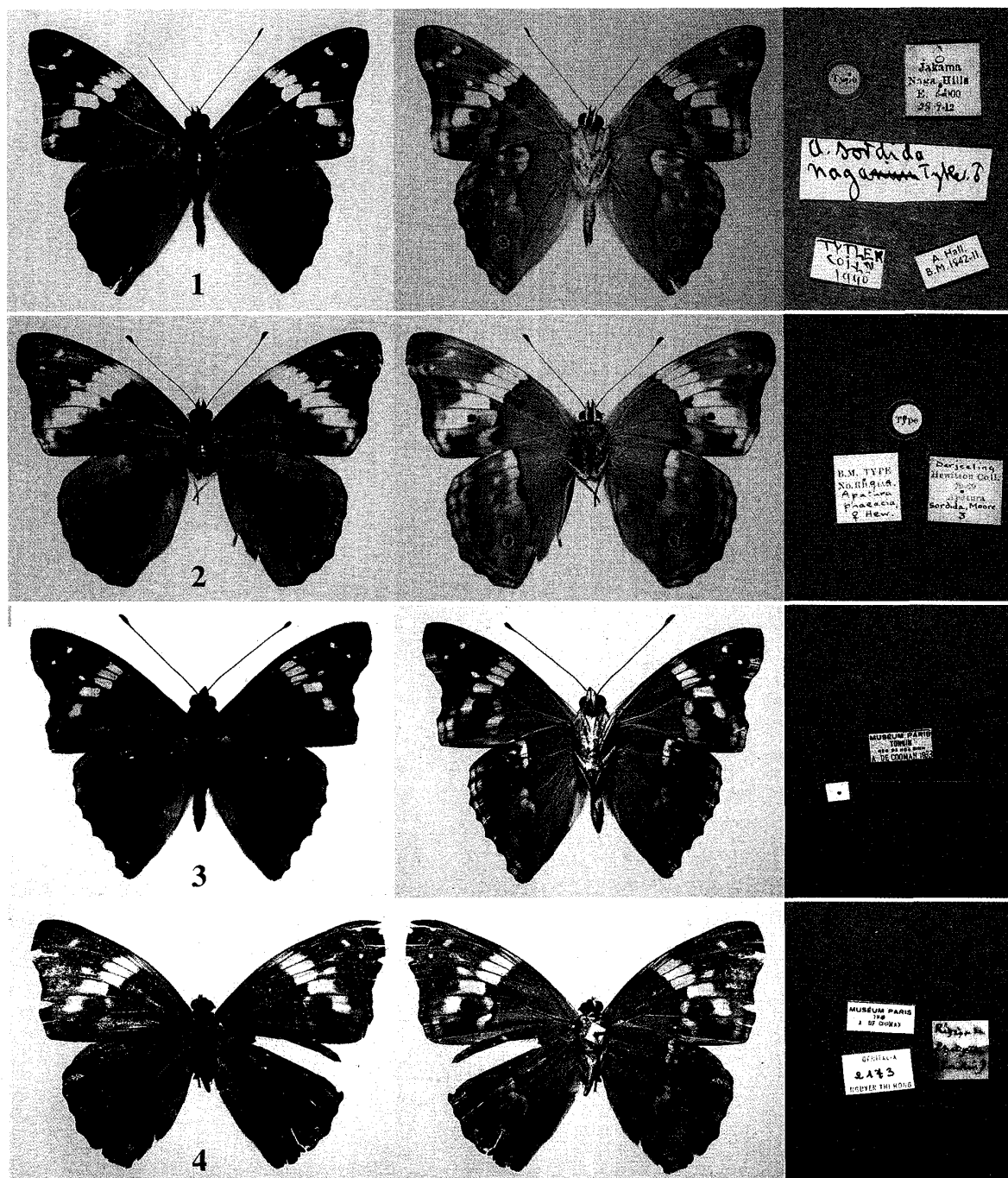
The north group has always been referred to as *Chitoria sordida* or as *C. sordida* ssp., while the east group as *Chitoria sordida vietnamica* or simply as *Chitoria vietnamica*. Both groups are separated by the appearance of adults and early stages, as well as the ecological behaviors of the caterpillars. For example, based upon Sashida *et al.* (1996) and Koiwaya & Wakahara (1998), distinguishing characteristics of the east group, in comparison with the north group, are as follows.

Adult forewing: (1) Tornus pointed, with termen emarginate in the male. (2) Upperside discocellular band yellow in the male, while creamy white in the north group. (3) Inner margin of the above-mentioned band linearly arranged in both sexes. (4) Lacking in underside sub-discocellular dark bar, which is obvious in the north group.

Adult hindwing: (5) Anal angle more sharply pronounced, with termen linearly shaped in the male. (6) Ground color of the underside silvery brown, while silvery green in the north group. (7) Discal white band on the underside linearly shaped. (8) Ocellus elongated along veins, *i. e.* oval shaped.

In addition, the early stages of the east group are different from the north one reported by Sashida *et al.* (1998) and Koiwaya & Wakahara (1998) as follows.

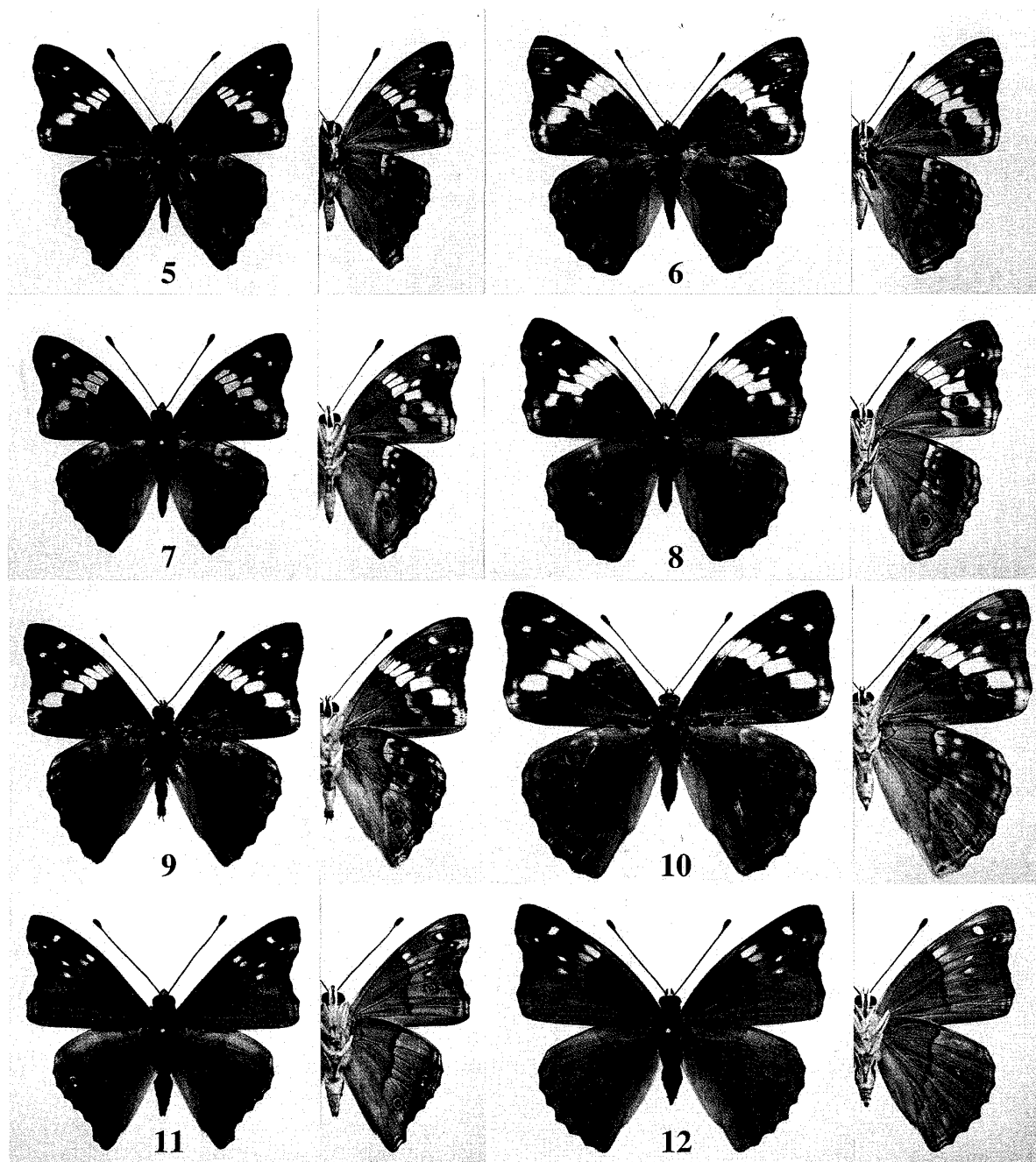
Eggs: (9) Laid singly, while in the north group, laid in a piled up cluster consisting of more than 100 eggs.



Figs 1-4. Type specimens of some *Chitoria* species. 1. "*Apatura sordida naga*" ♂, Jakama, Naga Hills, NE. India, 28 Sep. 1912. 2. "*Apatura phaeacia*", ♀, Darjeeling, N. India. 3. *Chitoria sordida vietnamica*, ♂, Tonkin (Hoa Binh), 1933. 4. *Chitoria sordida vietnamica*, ♀, Tonkin (Chong Tho), 1926 (?).

Larvae: (10) Head capsules significantly larger in early instars than those of the north group. (11) Horns of the head capsules robust. (12) Similar to larvae of *Chitoria modesta* in appearance. (13) Living on leaves singly, while in the north group, intensely gregarious as early instars.

Pupae: (14) Horns extending beyond the eyes shorter and the angle between them larger, than those of the north group. (15) Similar to pupae of *Chitoria cooperi* in appearance.



Figs 5–12. *Chitoria* spp. 5. *Chitoria sordida sordida*, ♂, Putao, N. Myanmar, Jul. 2000 (reared). 6. *Ditto*, ♀, Putao, N. Myanmar, May 2000 (reared). 7. *C. s. vietnamica*, ♂, Lak Sao, E. Laos, Sep. 1995 (reared). 8. *Ditto*, ♀, Lak Sao, E. Laos, Sep. 1999 (reared). 9. *C. naga*, ♂, Phong Sali, N. Laos, Apr. 2002. 10. *Ditto*, ♀, Phong Sali, N. Laos, May 2002. 11. *C. modesta*, ♂, Omeishan, Sichuan, S. China, Aug. 1998 (reared). 12. *Ditto*, ♀, Omeishan, Sichuan, S. China, Aug. 1998 (reared).

Taxonomic consideration

Sashida *et al.* (1996) first concluded that the east group is *Chitoria sordida vietnamica*, by comparison with *C. s. vietnamica* collected from north Vietnam. In 1998, based on some characters mentioned above, they stated that the north group should be given an independent specific status separated from the east group, though no name was given for

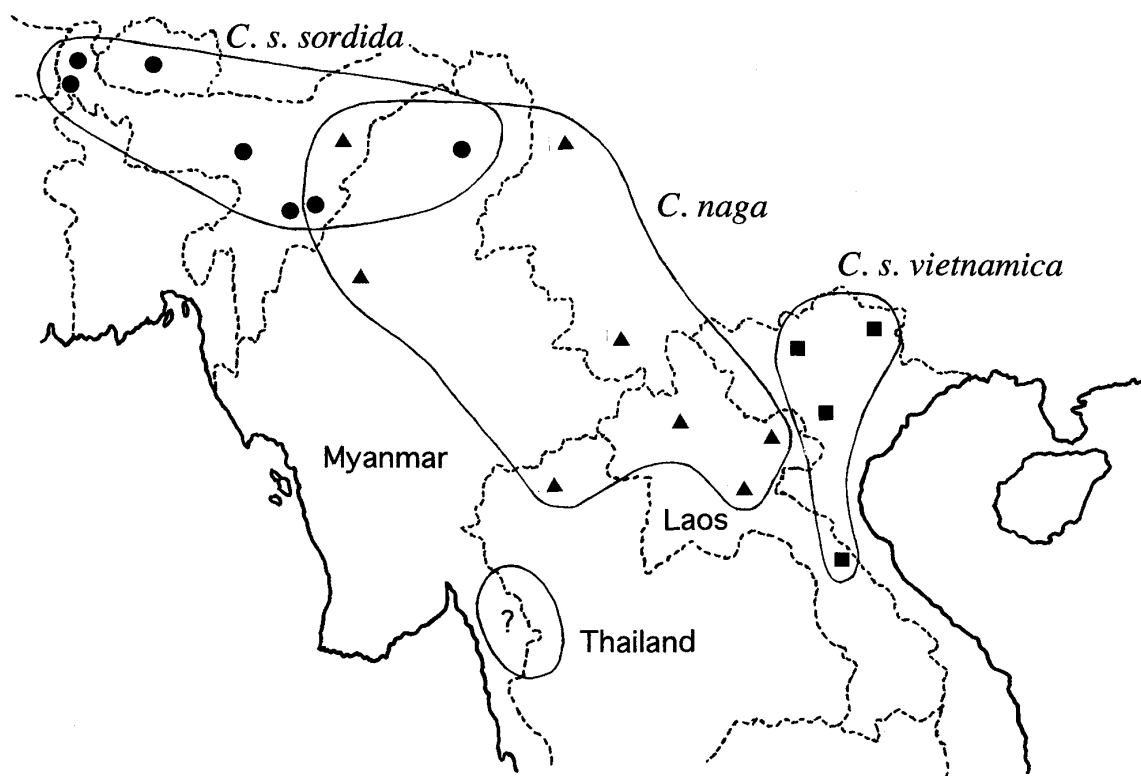


Fig 13. Distribution map of *Chitoria sordida* and *C. naga*.

the north group in the report.

This was the basis for the controversy on the classification. Koiwaya *et al.* (1998) also independently drew their conclusion that the north group and the east group are different species, selecting the former as true *sordida*, and consequently using *Chitoria sordida* for the north group, whereas *C. vietnamica* for the east group. This classification is repeated by Osada *et al.* (1999). Yoshino (1999) described *Chitoria sordida hani* from Xishuanbanna, S. Yunnan, which apparently belongs to the north group, judging from the photo of his type specimen.

In 2002, Mr Koiwaya obtained some specimens of *Chitoria sordida sordida* from N. Myanmar, which convinced him that the north group is not true *sordida*, suggesting to me that we should investigate “*Apatura sordida naga*” described by Tytler (1914b). Through my examination of the type specimens preserved in The Natural History Museum in London, I conclude that the north group should be called *Chitoria naga*. Hence, the status of taxa relevant to the *sordida-naga* group of species is summarized as follows.

Chitoria sordida (Moore, 1866)

ssp. *sordida* (Moore, 1866) (Figs 2, 5, 6)

Apatura sordida Moore, 1866, *Proc. zool. Soc. Lond.* **1865**: 765, pl. 41 (Darjeeling); Tytler, 1914b: 502 (Manipur); Antram, 1924: 132 (Sikkim; Assam & Manipur); Stichel, 1938: 253 (*part.*) (Sikkim–N. Burma).

Apatura phaeacia Hewitson, 1869, *Exot. Butterflies* **3** (4). (Darjeeling).

Apatura sordida sordida: Evans, 1932: 145 (Sikkim–N. Burma).

Chitoria sordida sordida: Nguyen, 1979: 42 (Darjeeling; Sikkim; Bhutan; Burma & Manipur).

ssp. *vietnamica* Nguyen, 1979 (Figs 3, 4, 7, 8)

Apatura sordida f. *sordida*: Dubois & Vitalis de Salvaza, 1924: 21 (Tonkin).

Apatura sordida: Demange, 1929, *Amat. Pap.* 4: 316 (Tonkin); Stichel, 1938: 254 (*part.*) (Tonkin).

Chitoria sordida vietnamica Nguyen, 1979, *Rev. fr. ent.* (N. S.) 1 (1): 42 (Tonkin: Hoa-Binh; Chong Tho; Bao-Ha); Masui & Inomata, 1991: 2 (N. Vietnam); Sashida & Miyamoto, 1996: 10, pl. 1 (Laksao); Sashida & Miyamoto, 1998: 4, pl. 2 (Laksao).

Chitoria vietnamica Koiwaya & Wakahara, 1998: 5 (Laksao); Osada *et al.*, 1999: 208, pl. 72 (Laksao).

***Chitoria naga* (Tytler, 1914), sp. rev. (Figs 1, 9, 10)**

Apatura sordida naga Tytler, 1914b: 502, pl. 1 (Naga Hills); Evans, 1932: 145 (Nagas); Stichel, 1938: 254 (Naga Hills).

Apatura naga: Antram, 1924: 132 (Naga Hills, 6000~).

Chitoria sordida naga: Nguyen, 1979: 42 (Naga Hills); Masui & Inomata, 1991: 3 (*part.*) (Naga Hills).

Chitoria sordida ssp.: Nguyen, 1979: 42 (Tsékou); D'Abrera, 1993: 369 (Tsekou); Masui & Harada, 1993: 4, pls (Xiang Kouang); Masui & Uehara, 1994: 4, pl. 2 (Xiang Kouang); Miyata & Hanafusa, 1994: 1, pl. 4 (Chiang Dao); Sashida *et al.*, 1996: 30 (Xiang Khouang); Osada *et al.*, 1999: 208, pl. 72 (Phong Sali).

Chitoria sordida: Koiwaya & Harada, 1996: 13 (Phong Sali); Koiwaya & Wakahara, 1998: 6 (Xiang Kouang); Sashida & Miyamoto, 1998: 4, pl. 2 (Xiangkouang); Igarashi & Fukuda, 2000: 502, pl. 208.

Chitoria sordita [*sic*] *hani* Yoshino, 1999: figs 6, 10 (Xishuanbanna). **Syn. nov.**

***Chitoria modesta* (Oberthür, 1906) (Figs 11, 12)**

Apatura modesta Oberthür, 1906: 19, pl. 7 (Siao-Loû; Mou-Pin; Tientsuen); Seitz, 1908: 244 (Siaolu; Mupin; Tientsin); Bollow, 1930: 195 (Tseku [*sic*]).

Apatura sordida modesta: Stichel, 1938: 254.

Chitoria sordida modesta: Nguyen, 1979: 45 (Siao-Lou; Moupin; Tien-Tsuen); Koiwaya, 1989: 234, pls 30–31 (Sichuan); Masui & Inomata, 1991: 2–3 (Siao-Lou; Mou Pin).

Chitoria modesta: Koiwaya & Wakahara, 1998: 6; Igarashi & Fukuda, 2000: 503, pl. 209 (SW. China).

Unidentified records

Apatura sordida: Tytler, 1911: 56 (Kohima about 5,000 ft; Manipur); de Nicéville, 1899: 331 (Ataran Valley, Tenasserim).

Diagnosis and range

Chitoria naga is separated from *C. sordida* based on the characters as described in the preceding section. The adult specimens are similar to each other at a glance, but easily distinguishable. *Chitoria sordida* is divided into two subspecies, namely, *C. s. sordida* and *C. s. vietnamica*, the latter male being broadly brownish above with the median oblique band yellow. As far as the author could examine, *Chitoria naga* exhibits little geographical variation.

Based on the records collected by the author, the distribution of the two species are summarized as follows (see Fig. 13). *Chitoria sordida sordida* ranges from Sikhim–Bhutan–Manipur to N. Myanmar, while *C. s. vietnamica* from N. Vietnam to E. Laos, where the recorded altitude of the both subspecies is about 500 m. *Chitoria naga* ranges from Nagaland–N. Myanmar–S. Yunnan–N. Thailand to N. Laos, where the altitude of the species is about 1,000–2,000 m. Though the two species, *C. sordida* and *C. naga*, appear to overlap around east India and north Myanmar, they are not sympatric species in terms of the altitude range.

Chitoria modesta (Oberthür, 1906) has often been regarded as a subspecies of *C. sordida*: however, the author draws the conclusion that *modesta* is a separate species from both *C. sordida* and *C. naga*, due to the different shape of the discal bands on the fore- and

hindwing underside.

Materials examined

Chitoria sordida sordida (Moore, 1866)

Syntype of *Apatura phaeacia* Hewitson, ♀, Darjeeling, N. India. 1 ♂ 1 ♀, Putao, N. Myanmar, May (♀) and Jul. (♂) 2000 (reared). 1 ♀, Imphal, Manipul, NE. India, Aug. 1995.

Chitoria sordida vietnamica Nguyen, 1979

Holotype of *Chitoria sordida vietnamica* Nguyen, ♂, Tonkin (Hoa Binh), 1933; paratype (allotype) of *Chitoria sordida vietnamica*, ♀, Tonkin (Chong Tho), 1926 (?). 2 ♂ 1 ♀, Lak Sao, E. Laos, Sep. 1995 (reared); 1 ♀, *Ditto*, Sep. 1999 (reared). 1 ♂ 1 ♀, Mt Pia Oak, N. Vietnam, May 2002 (reared).

Chitoria naga (Tytler, 1914)

Syntype of *Apatura sordida naga* Tytler, ♂, Jakama, Naga Hills, NE. India, 28 Sep. 1912. 1 ♂ 1 ♀, Phong Sali, N. Laos, Aug. (♂) and Sep. (♀) 1993; 1 ♂ 1 ♀, *Ditto*, Apr. (♂) and May (♀) 2002. 1 ♂ 1 ♀, Xiang Khouang, N. Laos, Sep. 1991. 1 ♂, Xam Neua, N. Laos, Jun. 2001. 1 ♂, Khamti, Sagain State, NW. Myanmar, Oct. 1997.

Chitoria modesta (Oberthür, 1906)

1 ♂ 1 ♀, Omeishan, Sichuan, S. China, Aug. 1998 (reared); 1 ♂ 3 ♀, *Ditto*, Nov. (♂) and Dec. (♀) 1998 (reared).

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References

- Antram, C. B., 1924. *Butterflies of India*. xvi, 226 pp., 2 pls. Calcutta, Simla.
 Bollow, von C., 1930. Nymphalidae; *Apatura*. In Seitz, A. (Ed.), *Gross-Schmett. Erde* 1 (Suppl.): 191–195.
 D'Abrera, B., 1993. *Butterflies of the Holarctic Region* 3: 336–524.
 de Nicéville, L., 1899. Notes on some butterflies from Tenasserim in Burma. *J. Bombay nat. Hist. Soc.* 12: 329–336, pl. BB.
 Dubois, MM. E. & R. Vitalis de Salvaza, 1924. Lépidoptères de l'Indochine Française. *Opuscs. Inst. scient. Indoch.* 3: 3–23.
 Evans, W. H., 1932. *The Identification of Indian Butterflies* (2nd Edn). x, 454 pp., 32 pls. Madras.
 Igarashi, S. & H. Fukuda, 2000. *The Life Histories of Asian Butterflies* 2. xxviii, 712 pp. Tokyo.
 Koiwaya, S., 1989. *Studies of Chinese Butterflies* 1. 240 pp.
 Koiwaya, S. & M. Harada, 1996. Early stages of some butterflies from Northern Laos. *Butterflies* (15): 3–17 (in Japanese with English summary).
 Koiwaya, S. & H. Wakahara, 1998. Early stages of some butterflies from Laos (1). *Butterflies* (19): 4–17 (in Japanese with English summary).
 Masui, A. & M. Harada, 1993. Early stages of the genus *Chitoria*, Apaturinae. *Gekkan-Mushi* (273): 4–6, pls 1–2 (in Japanese with English summary).
 Masui, A. & T. Inomata, 1991. Apaturinae of the world (2). *Yadoriga* (146): 2–14 (in Japanese with English

summary).

- Masui, A. & J. Uehara, 1994. Butterflies recently collected from Lao P. D. R. (1). *Gekkan-Mushi* (276): 4-9, pl. 2 (in Japanese with English summary).
- Miyata, T. & H. Hanafusa, 1994. Newly recorded butterflies from Thailand (Lepidoptera: Nymphalidae). *Futao* (17): 1-2, pl. 4.
- Moore, F., 1866. On the Lepidopterous insects of Bengal. *Proc. zool. Soc. Lond.* **1865**: 755-823, pls 41-43.
- Nguyen, T. H., 1979. La variation géographique de *Chitoria sordida* (Lepidoptera: Nymphalidae). *Rev. fr. ent.* (N. S.) **1** (1): 42-45.
- Oberthür, C., 1906. Description d'une nouvelle espèce d'*Apatura*. *Étud. Lépid. comp.* **2**: 19-20, pl. 7.
- Osada, S., Uémura, Y. & J. Uehara, 1999. *An illustrated Checklist of the Butterflies of Laos P. D. R.* 240 pp. Tokyo.
- Sashida, H. & T. Miyamoto, 1996. Notes on the butterflies from Lao P. D. R. (2). *Chitoria sordida vietnamica* was captured from eastern Lao P. D. R. (Lepidoptera, Nymphalidae). *Gekkan-Mushi* (306): 10-11., pl. 1 (in Japanese with English summary).
- , 1998. Notes on the butterflies from Lao P. D. R. (3). Ecology and early stages of *Chitoria sordida vietnamica* discovered from eastern Lao P. D. R. (Lepidoptera, Nymphalidae). *Gekkan-Mushi* (326): 4-6, pl. 2.
- Sashida, H., Miyamoto, T. & H. Wakahara, 1996. Notes on the butterflies from Lao P. D. R. (1). Ecology and life-history of *Chitoria sordida* in the middle area of Lao P. D. R. *Butterflies* (13): 30-34 (in Japanese with English summary).
- Seitz, A., 1908. Berichtigungen und Zusätze. In Seitz, A (Ed.), *Gross-Schmett. Erde* **1**: 244.
- Stichel, H., 1938. Apaturinae. In Bryk, F. (Ed.), *Lepid. Cat.* **86**: 156-374.
- Tytler, H. C., 1911. Notes on butterflies from the Naga Hills. *J. Bombay nat. Hist. Soc.* **21**: 48-65, pls A, B.
- , 1914a. Notes on some interesting butterflies from Manipur and the Naga Hills. Part I. *J. Bombay nat. Hist. Soc.* **23**: 216-229, pl. I.
- , 1914b. Notes on some interesting butterflies from Manipur and the Naga Hills. Part II. *J. Bombay nat. Hist. Soc.* **23**: 502-515.
- Yoshino, K., 1999. New butterflies from China 5. *Neo Lepidoptera* (4): 1-10, 2 pls.

摘 要

ソルディダコムラサキおよびナガランドコムラサキ(新称)に関する検討(増井暁夫)

近年、ラオス産のソルディダコムラサキ *Chitoria sordida* (Moore, 1866) に関する研究が進み、北部のシェンクアン Xiang Kouang, ポンサリ Phong Sali, サムヌア Xam Neua に分布する北部個体群と、東部のラクサオ Lak Sao に分布する東部個体群が明瞭に区分されるようになった。後者に対しては、亜種名 *vietnamica* Nguyen, 1979 を適用すべきことが指摘されている。両個体群は、成虫の斑紋ならびに幼生期の形態的・生態的特徴により互いに別種の地位を占めるべきと理解されてきたものの、北部個体群に適用すべき名称は未確定であり、単に *Chitoria sordida* の一亜種、と記述されたことが多かった。以上の状況により、所謂ソルディダコムラサキの分類に関する再検討が迫られていた。

今般、著者は各地産の所謂ソルディダコムラサキの標本を入手し、小岩屋敏氏の示唆により、それらをロンドンおよびパリの自然史博物館に保管されるタイプ標本と比較する機会を得た。その結果、北部個体群は、北東インドのナガランドを基産地とする独立種 *Chitoria naga* (Tytler, 1914) に帰属すべきことが判明した。雲南省シーサンパンナを基産地として命名された *Chitoria sordida hani* Yoshino, 1999 は、*Chitoria naga* のシノニムである。

真のソルディダコムラサキ *Chitoria sordida* (Moore, 1866) はシッキムからベトナム北部にかけて2亜種が分布し、標高500 m程度の低山地に棲息する。シッキムからミャンマー北部まで原名亜種を産し、ベトナム北部とラオス東部には亜種 *vietnamica* Nguyen, 1979 を産する。亜種 *vietnamica* は、原名亜種と比較して♂翅表が広く茶色味を帯び、前翅表の中室端明色帯が黄色くなることで区別される。

ナガランドコムラサキ(新称) *Chitoria naga* (Tytler, 1914) は北東インドのナガランド州を基産地とし、ミャンマー北部、雲南省、タイ北部、ラオス北部にかけて分布し、ソルディダコムラサキの分布圏と部分的に重複するが、標高1,000-2,000 m程度の高地を好む。一見ソルディダコムラサキ *Chitoria sordida* とよく似た外観を有し、Antram (1924) を除けば、今まで本種に対して常にソルディダコムラサキ

Chitoria sordida の名称が誤用されてきた。♂♀ともソルディダコムラサキとは翅型が異なり、前翅裏面の中室端暗色条の存在などの斑紋で区別されるだけでなく、母蝶が卵塊を形成し、幼生期における群居性が著しいといった点でも明確に異なる。本種は地理的変異が小さいと考えられる。

なお、従来しばしば *C. sordida* の亜種とされてきた *C. modesta* (Oberthür, 1906) は、上記の両種のどちらにも帰属しない独立種であると考ええる。

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